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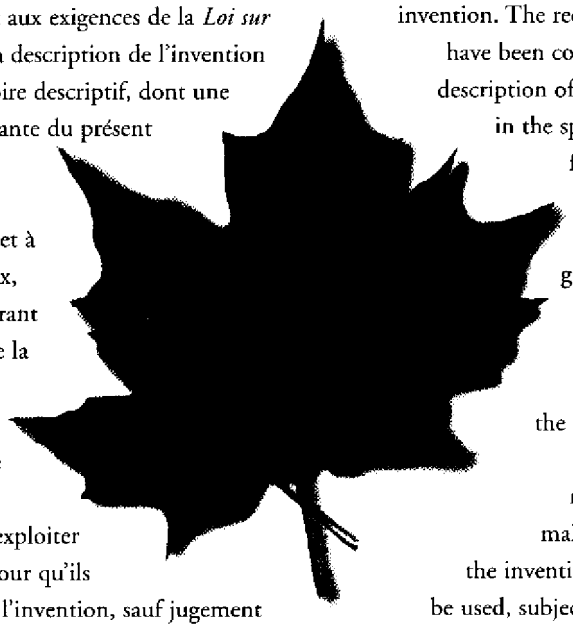
Brevet canadien / Canadian Patent

Le commissaire aux brevets a reçu une demande de délivrance de brevet visant une invention. Ladite requête satisfait aux exigences de la *Loi sur les brevets*. Le titre et la description de l'invention figurent dans le mémoire descriptif, dont une copie fait partie intégrante du présent document.

Le présent brevet confère à son titulaire et à ses représentants légaux, pour une période expirant vingt ans à compter de la date du dépôt de la demande au Canada, le droit, la faculté et le privilège exclusif de fabriquer, construire, exploiter et vendre à d'autres, pour qu'ils l'exploitent, l'objet de l'invention, sauf jugement en l'espèce rendu par un tribunal compétent, et sous réserve du paiement des taxes périodiques.



The Commissioner of Patents has received a petition for the grant of a patent for an invention. The requirements of the *Patent Act* have been complied with. The title and a description of the invention are contained in the specification, a copy of which forms an integral part of this document.

The present patent grants to its owner and to the legal representatives of its owner, for a term which expires twenty years from the filing date of the application in Canada, the exclusive right, privilege and liberty of making, constructing and using the invention and selling it to others to be used, subject to adjudication before any court of competent jurisdiction, and subject to the payment of maintenance fees.

BREVET CANADIEN **2,381,217** CANADIAN PATENT

Date à laquelle le brevet a été accordé et délivré	**2010/04/27**	Date on which the patent was granted and issued
Date du dépôt de la demande	**2000/07/13**	Filing date of the application
Date à laquelle la demande est devenue accessible au public pour consultation	**2001/01/25**	Date on which the application was made available for public inspection

Commissaire aux brevets / Commissioner of Patents

Canada

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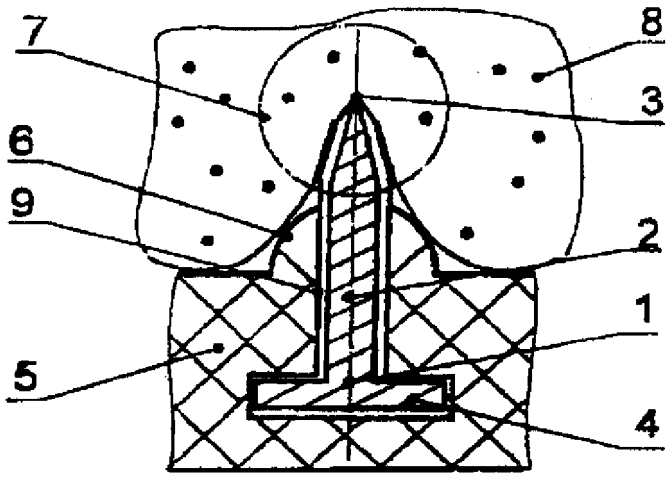
(54) Titre : APPLICATEUR POUR UTILISATION EN REFLEXOTHERAPIE
(54) Title: AN APPLICATOR FOR USE IN REFLEXOTHERAPY



(57) Abrégé/Abstract:
The inventive needle may be used for reflexotherapy (i.e. acupuncture and application acupressure) both at medical institutions and under home conditions. The needle may be used either as a component part of applicators or as independent instrument for practising acupuncture. The needle (1) for use in reflexotherapy comprises a base in the form of a rod member (2) provided with a sharpened portion (3) at one end thereof, said rod being made of steel, copper, chromium, nickel, or silver, and a coat made of chromium, nickel, copper, or silver. The novel feature of the needle consists in that the coat of the needle (1) base is made partial with formation, close to the sharpened area, of a region (7) composed by at least two materials having different electrochemical potentials, while the base and the coat are made of chemical elements selected from a group additionally including cobalt, aluminium, magnesium, zinc, tin, titanium, vanadium, beryllium, gold, platinum, palladium, strontium, tellurium, and alloys and oxides thereof. The invention provides both mechanical and electrical actions of the needle on a corresponding area of the user's body, and appropriate selection of materials for needle base and coats with the aim of presetting parameters of microcurrents; it permits to expand the possibilities of electrophoresis due to transfer of a greater quantity of microelements into the the user's body, and to intensify electrophoresis due to the presence of microcurrents. Also claimed is an applicator using such needle. Such applicator provides generating a three-dimensional complicated heterogeneous electrical field of microcurrents between the needles, and microcurrents between the bases of individual needles and coats thereof; presetting required parameters of microcurrents, smoothing the uniformity of electrical field of the user's skin by way of electrophoresis, said uniformity being disturbed by a disease; introducing a greater set of microelements in the user's body, and intensifying the process of this introduction.

AN APPLICATOR FOR USE IN REFLEXOTHERAPY

Field of Invention

The present invention relates to devices intended for stimulating specific reflex areas or individual reflex areas of the human body, and particularly to applicators for use in reflexotherapy, and may be used both at medical institutions and under home conditions.

Background of the Invention

Known in the art is a needle for acupuncture, whose sharpened portion is provided with a coatinging made of material other than the rod (SU-A-1264942), i.e. the needle provided with a partial coatinging. Availability of such coatinging provides exposure to the needle surface, in the area of its contact with the user's epidermis, of two materials having different electrochemical potentials, and hence generation of galvanic microcurrents in the epidermis, whose lines of force extend in the planes passing through the needle axis. The use of such needles in the applicator generates an electrical field that is uniform in terms of arrangement of its lines of force.

The most relevant device to the proposed applicator comprises an applicator having a base member and needles fixed therein, each of said needles having a rod, a sharpened portion, and a head portion; some needles are made of materials that are different from materials of other needles, and at least a portion of needles are provided with continuous (i.e. covering the whole needle surface) coatings of dissimilar materials other than those used as needle materials (SU-A-1797889).

Application of coatings to the whole surface of needles generates galvanic microcurrents in the user's epidermis only between the needles made of different materials or provided with coatings of different materials, i.e. microcurrents flowing substantially in the planes perpendicular to needle axes, i.e. substantially parallel to the surface of epidermis, and generating an electrical field that is uniform in terms of arrangement of its lines of force, thereby eliminating the possibility of smoothing, upon application, of the electrical field in the user's epidermis, disturbed by a disease, and restricting the set of microelements supplied to the

user's body from the needles since the user's body is supplied only with microelements from the coatings together with an insignificant amount of microelements from the needle material due to the diffusion through the coatings. In addition, although such arrangement permits the use of inexpensive, hard, and durable materials such as steel, copper, brass etc. to make the needles, and soft, expensive, and rare materials such as Sn, Au, Ag etc. for coatings, application of coating to the whole surface of needles will require rather substantial consumption of valuable materials.

Thus, the applicator disclosed in SU-A-1797889, and the applicator provided with needles and disclosed in SU-A-1264942 generate electrical fields having uniform arrangement of lines of force but differing in planes of arrangement of such lines.

Brief Description of the Invention

The main object of the present invention consists in improving the applicator by way of providing exposure to the surface of the contact area between needles and user's epidermis of at least two materials having different electrochemical potentials, thereby providing generation of a three-dimensional complicated heterogeneous electrical field caused by interaction of galvanic microcurrents flowing both between needles and between materials of individual needles and their coatings, and hence smoothing by way of electrophoresis the uniformity of electrical field of the user's epidermis, disturbed by a disease, as well as delivering of a greater set of microelements to the user's body, and intensifying the process of this delivery.

The object set forth is achieved by that in an applicator comprising a base member and needles fixed therein, each of said needles comprising a rod, a sharpened portion, and a head, at least a portion of needles being provided with coatings, and at least a portion of needles being different from the other portion in terms of materials said needles are made of, and/or materials of coatings, according to the invention the coatings on a portion of needles are made partial to provide exposure to the surface of contact between each such needle and user's epidermis of at least two materials having different electrochemical potentials

In contrast to prior art applicators, the inventive applicator ensures generation, in the epidermis, of galvanic microcurrents both between different

materials of each needle provided with a coating (i.e. between needle material and at least the material of a single-layer coating) and between the needles, the inventive applicator providing a higher number of microcurrents between the needles than the prior art applicator since each coatinged needle generates at least two microcurrents with each adjacent needle. Lines of force of the fields generated by these microcurrents extend in mutually perpendicular planes and interact with one another, thereby developing a three-dimensional complicated heterogeneous electrical field in the user's epidermis. Here, the heterogeneity of electrobiochemical condition of epidermis during interaction thereof with different materials of needle surfaces results in independent monitoring of microcurrent parameters between needles and between dissimilar materials of individual needles. As a result of application, high heterogeneity of the electrical field causes smoothing of electrical field uniformity of the user's epidermis, disturbed by a disease. At the same time, exposure to the surface of the contact area between needles and user's epidermis of two or more materials having different electrochemical potentials, also ensures transfer, to the user's body, of a greater set of microelements since microelements are transferred to the user's body both from the needle base materials and from coatings), and improves the intensity of such transfer.

It is expedient to make partial coatings of needles multilayer, thereby ensuring the exposure to the surface of the area of contact between each needle provided with such coating and epidermis of several materials having different electrochemical potentials, which in turn increases the number of various microcurrents in the user's epidermis, said microcurrents flowing both between materials of individual needles and between needles, and providing the contact between epidermis and several materials of individual needles, and hence increasing heterogeneity of the resulting electrical field and expanding the set of microelements transferred from needle materials and their coating layers to the user's body.

It is also expedient to arrange needles in the applicator in such way that adjacent needles comprise different materials exposed to the surface of their areas of contact with the user's epidermis.

Brief Description of Drawings

The invention is further described in more detail in terms of specific embodiments thereof and with reference to the accompanying drawings, in which:

Fig.1 shows a cross-section of a fragment of the inventive applicator, comprising a needle provided with a single-layer coating with the exception of the sharpened portion thereof, said needle interacting with the user's epidermis;

Figs 2 and 3 demonstrate schematic drawings of stripped sharpened portion of the needle shown in Fig.1;

Fig.4 shows schematic drawing of generation of galvanic microcurrent in the epidermis between the material and the coating of the needle in shown Fig.1;

Fig.5 demonstrates schematic drawing of the needle provided with the coating only on the sharpened portion thereof;

Fig.6 shows schematic drawing of the needle provided with coatinged sharpened portion and exposed apex of this portion;

Fig.7 demonstrates schematic drawing of the needle provided with a two-layer coating applied to the needle except the sharpened portion thereof;

Fig.8 shows schematic drawing of the needle provided with a single-layer coating, and the coating applied to the sharpened portion on top of the first layer;

Fig.9 demonstrates schematic drawing of the needle provided with a single-layer coating, a coating applied to the sharpened portion on top of the first layer, and exposed apex of the sharpened portion;

Fig.10 shows schematic drawing of the needle provided with a triple-layer coating of the needle base, a coating applied to the sharpened portion on top of the above three layers, and exposed apex of the sharpened portion;

Fig.11 demonstrates top view of a fragment of the schematic drawing of the inventive applicator;

Fig.12 shows section A-A of the applicator of the invention, shown in Fig.11.

Preferred Embodiment of the Invention

Needle 1 of the applicator (Fig.1) comprises rod member 2 provided with sharpened portion 3 at one end and head 4 at the other end thereof. Needle 1 is fixed in base member 5 of the applicator so that its part provided with sharpened portion 3 protrudes above surface 6 of base member 5. Area 7 close to sharpened portion 3, i.e. the area of contact between needle 1 and user's epidermis 8,

occupies the side surface of needle 1 from sharpened portion 3 to surface 6 or a portion of this surface, depending on required depth of penetration of needle 1 into epidermis 8, said depth depending on a pressure acting on the applicator, density of needles arrangement and sharpness of their sharpened portions, area 7 including at least two materials having different electrochemical potentials and exposed to the needle surface: material of needle 1 base and material of layer 9 of the coating applied to needle 1 except sharpened portion 3 thereof (except sharpened portion 3 or a part thereof, or except sharpened portion 3 and a part of rod 2 close to sharpened portion 3 since it is rather difficult to coating the whole rod with exact exception of sharpened portion 3). Needle 1 is made of iron or steel, and layer 9 of the coating may be made e.g. of nickel, chromium, zinc, or copper. Needle 1 may be also made of copper or copper alloy, e.g. brass, and layer 9 of the coating may consist of nickel, chromium, or silver. Here, it is expedient to coating nickel with chromium. The coating may be applied with the use of various methods such as dipping, spraying, or galvanising.

It is expedient to apply layer 9 of the coating to whole needle 1, including sharpened portion 3 thereof, and then to strip sharpened portion 3 by removing the coating e.g. by grinding off coating 9 next to sharpened portion 3 to form a cone (Fig.2), said grinding off being carried out over conical surface 10 with removal of part 11 of layer 9, or by cutting off the coating over plane 10 (Fig.3) with removal of part 11 of layer 9.

Upon penetration of needle 1 (Fig.4) into the user's epidermis 8 comprising a liquid ionised constituent, the difference of electrochemical potentials between the material of needle 1 and the material of layer 9 of the coating results in generation of galvanic microcurrent G, in formation of a galvanic cell with electrodes represented by material of needle 1 and layer 9 of the coating, and electrolyte represented by the liquid ionised part of epidermis 8. Mechanical irritation of epidermis 8, caused by penetration of needle 1, is accompanied by the action on the epidermis of the electrical field generated by galvanic microcurrent G. In addition, there occurs transfer to epidermis 8 of microelements both from sharpened portion 3 of the needle and from layer 9 of the coating, such transfer being considerably intensified through the presence of galvanic microcurrent G, thereby increasing the effects of both reflexotherapy and electrophoresis, said

effects being both qualitative (two types of microelements) and quantitative (more intense transfer of microelements).

Fig.5 demonstrates needle 1 provided with layer 12 of the coating applied to sharpened portion 31. Needle 1 and coating 12 may be made of the same materials as specified in the previous embodiment of needle 1. This embodiment of needle 1 is the most expedient when applying coatings of precious and rare materials such as platinum, gold, silver, tellurium etc., since such arrangement results in considerable decrease of their consumption (these metals are used only for coatinging sharpened portion 3 rather than whole needle 1).

When removing the coating from a part of sharpened portion 3 (Fig.6), two galvanic couples are formed: between apex 13 of sharpened portion 3 of needle 1 and coating 14 (galvanic microcurrent G_1), and between coating 14 and rod 2 (galvanic microcurrent G_2).

The area of contact between needle 1 and user's epidermis 8 (Fig.7) may be composed of the material of needle 1 and several, e.g. two layers 15 and 16 of coating, stripped close to sharpened portion 3 of needle 1. In this case, three different galvanic couples are formed: layer 15 of coating – sharpened portion 3 (galvanic microcurrent G_3); layer 16 – sharpened portion 3 (galvanic microcurrent G_4), and layer 15 – layer 16 (galvanic microcurrent G_5). This fact further intensifies electrical action of the applicator and provides transfer of microelements to epidermis 8 from all the three materials: needle 1 and layers 15 and 16. It should be also noted that transfer of microelements from rod 2 and layer 15, through layer 16 and into the user's epidermis 8 is also carried out due to diffusion, the amount of this transfer being substantial as a result of large contact area between rod 2 and layer 15, between layers 15 and 16, and between layer 16 and epidermis 8. Needle 1 may be provided with still more layers of coating, which fact results in intensification of the action caused by electrical fields and permits to transfer a greater number of various microelements to epidermis 8.

The area of contact between needle 1 and epidermis 8 may be composed (Fig.8) of one coating layer 17 applied to the whole needle 1, and coating layer 18 applied on the top of layer 17 on sharpened portion 3 of needle 1. In this case, layer 17 – layer 18 galvanic couple is formed (galvanic microcurrent G_6), and transfer of microelements from the material of needle 1 and layers 17, 18 occurs by diffusion, due to a larger area of contact between all the surfaces.

The above-disclosed embodiment of the invention may be somewhat modified if sharpened portion 3 is stripped to remove layers 17, 18, e.g. by way of grinding them off (Fig.9) (or due to quick wear during the use of applicator). In this case, galvanic microcurrent G_6 between layers 17, 18 is supplemented by galvanic microcurrent G_7 between layer 17 and sharpened portion 3, and galvanic microcurrent G_8 between layer 18 and sharpened portion 3. This intensifies the electrical action of needle 1 on epidermis 8 and transfer of microelements from the material of needle 1 and coating layers 17, 18.

Needle 1 may be provided with a multilayer coating, comprising e.g. layers 19, 20, 21 applied to the whole needle, and layer 22 applied only to sharpened portion 3 thereof. All these layers are cut away along plane 23, each layer being exposed to the surface of needle 1. This results in the formation of five different galvanic microcurrents (not shown), leading to a considerable intensification of the electrical action of needle 1 on epidermis 8, and transfer of four various microelements thereto.

One or more layers of coating may be applied by spraying that results in formation of loose or dense layers. Loose layers of coatings increase the flow of microelements passing therethrough.

The order of location of materials on the needle, in the direction from the needle material and toward the external layer, may be e.g. the following:

Fe (steel) – Ni – Cu (or Pt, or Pd, or Au) – Ag;

Fe – Ni – Au;

Fe – Cr – Au;

Fe – Cr (or Ag, or Cu) – Cu (or Pt);

Fe – Zn – Cr;

Cu – Ag;

Cu – Ni – Cr.

The needles are made of Fe or Cu or alloys thereof, e.g. steel or brass. They may be provided with coating layers of all the above metals in the above-specified order, e.g. first layer of nickel, second layer of copper (or platinum, or palladium, or gold), and third layer of silver. Copper or brass base may be coatinged with silver, gold, platinum, palladium, and nickel with a thin layer of chromium.

As shown in Figs 11, 12, the inventive applicator preferably comprises base member 5 with needles 24-32 fixed therein, at least a portion of needles 24-32 being provided with partial single- or multilayer coatings with exposure to the surface of the areas of contact between the needles and user's epidermis 8 of at least two materials having different electrochemical potentials. Needles 24-32 are made of different materials and provided with coatings located e.g. in the following order: one row 33 consists of solid copper needle 24; steel needle 25 provided with nickel coating and exposed sharpened portion 3; needle 26 made of steel or iron and provided with solid copper coating layer 36 and silver (or gold, or platinum, or palladium) coating layer 37 on sharpened portion 3; needle 27 made of iron or steel provided with double-layer coating of zinc and chromium, and exposed sharpened portion 3; needle 28 made of copper and provided with silver (or gold, or platinum, or palladium) coating on sharpened portion 3 etc. Another row 38 consists of copper or brass needle 29 provided with double-layer coating of nickel and chromium; copper needle 24; iron or steel needle 30 provided with double-layer coating of zinc and chromium; steel needle 31; copper or brass needle 32 provided with copper coating over the whole needle except sharpened portion 3 thereof etc. In subsequent rows, the order of location can be either similar or different; the critical point consists in that each needle has to be surrounded by needles whose materials and coatings are different. Such arrangement accelerates electrophoresis and provides smoothing, as a result of reflexotherapy, of the natural heterogeneity of the electrical field of epidermis.

The applicator operates as follows:

Penetration of needles 24-32 into epidermis 8 generates the effect of mechanical irritation of a selected area of the user's body surface. At the same time, within the area of contact between needles 25, 26, 27, 28, 29, 30, 32 and the epidermis, galvanic microcurrents G_B are generated (said microcurrents have been disclosed herein for various embodiments of needles); these microcurrents are flowing in the planes of needle axes and causing the effect of weak electrical fields on the user's epidermis 8. In addition, different electrical potentials of various needles cause generation of galvanic microcurrents G_r between materials of adjacent needles and their coatings, flowing in the planes perpendicular or inclined to the planes of microcurrent flows between materials of individual needles. Microcurrents G_r interact with microcurrents G_B generated by individual needles,

thereby generating a three-dimensional complicated heterogeneous electrical field in the user's epidermis 8. Various microelements are transferred from needles 24-32 into epidermis 8, the intensity of their transfer to epidermis 8 being amplified by microcurrents flowing therein. Due to diversity of electrobiochemical conditions of epidermis 8 during interaction thereof with materials of needle surfaces, epidermis 8 performs automatic adjustment of microcurrent and electrophoresis parameters.

Arrangement of needles in the applicator, as well as needle and coating materials are selected depending on the desired action of the applicator on selected areas of users' bodies (required intensity of mechanical action, electrical field parameters, and saturation with certain microelements).

In the simplest case, two kinds of needles, e.g. copper (brass) or steel, and needles having single type of coating/coatings may be used.

The needles may be also arranged in rows, each row being formed by the needles made of the same or similar materials, and differing by needle materials from the needles in other rows, thereby causing generation of a more homogeneous electrical field.

To manufacture needles and coatings, the use can be made of chemical elements selected from the group comprising copper, iron, nickel, chromium, cobalt, aluminium, magnesium, zinc, tin, silver, titanium, vanadium, beryllium, gold, platinum, palladium, strontium, tellurium, as well as alloys and oxides thereof. This permits to produce durable and inexpensive needles provided with coatings of small quantities of precious and rare materials, to expand the set of materials used, and hence to provide numerous galvanic couples generating a variety of microcurrents having various parameters. This also permits the transfer of numerous microelements into the user's body.

CLAIMS

1. An applicator for use in reflexotherapy, comprising:

a base member;

a plurality of needles fixed in said base member;

each said needle comprising a rod member having a sharp portion at a first end of said rod member, and a head portion at a second end thereof;

said head portion being wider than said rod member;

said rod member having a central longitudinal axis disposed in a first predetermined direction;

all head portions of said needles having major planar surfaces in a flat plane perpendicular to said first longitudinal axis of said rod member;

said needles being fixed in said base member so that said sharp portions protrude from said base member;

said rod member being made from a base material;

said needles including one or more first needles made from and/or coated with a first material, and one or more second needles made from and/or coated with a second material;

one or more third needles made from and/or coated with a third material having a different electrochemical potential than that of said first and second materials;

the coating on at least one of said needles comprises a multilayer coating of different materials;

the material in said needles and/or coatings being selected from steel, copper, chromium, nickel, silver, cobalt, aluminum, magnesium, zinc, tin, titanium,

vanadium, beryllium, gold, platinum, palladium, strontium and tellurium or alloys or oxides therof;

said first and second materials having different electrochemical potentials;

each said needle being surrounded by needles having base materials and coatings made from different materials;

said needles being arranged in said base member in a configuration whereby, when adjacent needles having sharp portions are exposed to a surface of contact with a user's epidermis, said sharp portions are either coated with and/or are made from different materials; and

said partially-covered needles expose a surface of contact between each needle and the user's epidermis to at least said first and second materials.

2. An applicator for use in reflexotherapy, comprising:

a base member;

a plurality of needles fixed in said base member;

each said needle comprising a rod having a sharp first end and a head on a second end fixed in said base member so that said sharp first end protrudes from said base member;

said rod having a longitudinal axis;

said head being wider than said rod, and all heads of said needles having major planar surfaces disposed in one flat plane perpendicular to said longitudinal axis of said rod;

said needles being partially covered with a coating;

the coating on at least some of said needles comprises a multilayer coating of different materials;

the material in said needles and/or coatings is selected from steel, copper, chromium, nickel, silver, cobalt, aluminum, magnesium, zinc, tin, titanium, vanadium, beryllium, gold, platinum, palladium, strontium and tellurium or alloys or oxides thereof;

said needles including at least a first set of needles made from and/or coated with a first material, and a second set of needles made from and/or coated with a second material;

said first and second materials having different electrochemical potentials, whereby, in use, a surface of contact between each needle and a user's epidermis is exposed to at least said first and second materials having said different electrochemical potentials;

at least one additional set of needles being made from and/or coated with another material having a different electrochemical potential than said first and/or second set of needles; and

said needles being arranged in said base member in a configuration whereby adjacent needles having sharp first ends exposed to the surface of contact with the user's epidermis are either coated with and/or made from different materials.

3. An applicator for use in reflexotherapy comprising:

a base member;

needles fixed in said base member;;

each of said needles comprising a rod having a sharp first end and a head at a second end thereof;

each said needle being fixed in said base member so that said sharp first end protrudes from said base member;

said rod having a longitudinal axis;

said head being wider than said rod;

all heads of all needles having major planar surfaces disposed in one flat plane perpendicular to said longitudinal axis of said rod;

at least a portion of said needles being made with solid and/or partial coatings;

in the case of partial coating of the rods, areas near the sharp first ends including at least two materials having different electrochemical potentials;

needle rods and coatings being made of material selected from the group consisting of copper, chromium, nickel, silver, cobalt, aluminum, magnesium, zinc, tin, titanium, vanadium, beryllium, gold, platinum, palladium, strontium and tellurium or alloys or oxides thereof; and

the needles being arranged in the base member in a configuration such that adjacent needles comprise different rod and coating materials.

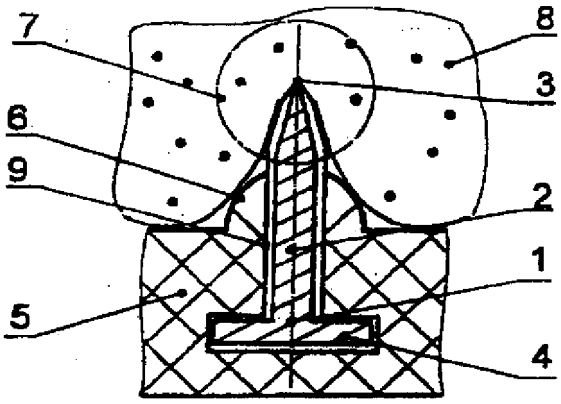


Fig. 1

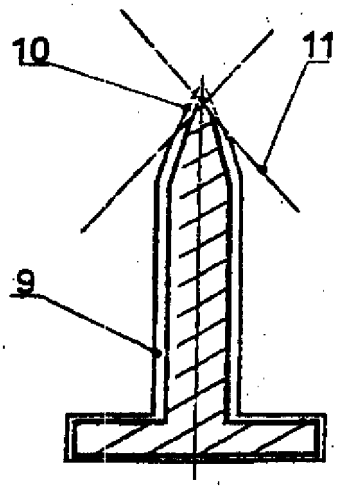


Fig. 2

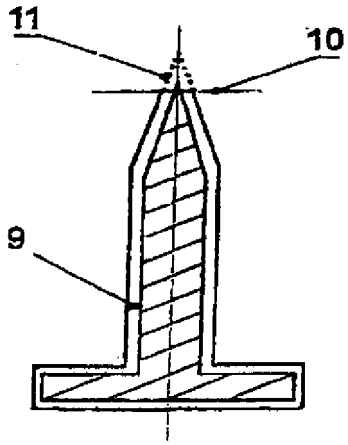


Fig. 3

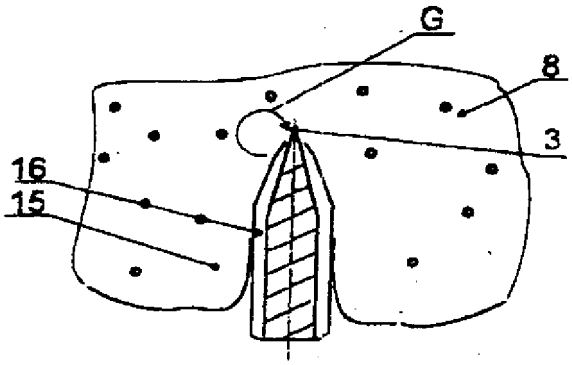


Fig. 4

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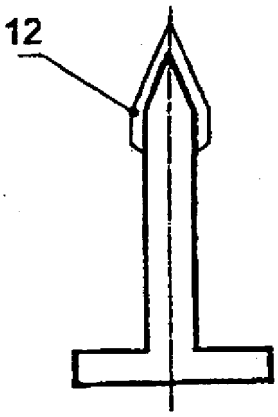

Fig. 5

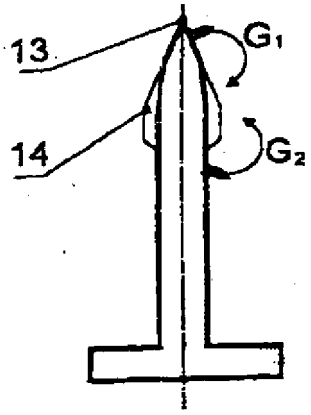

Fig. 6

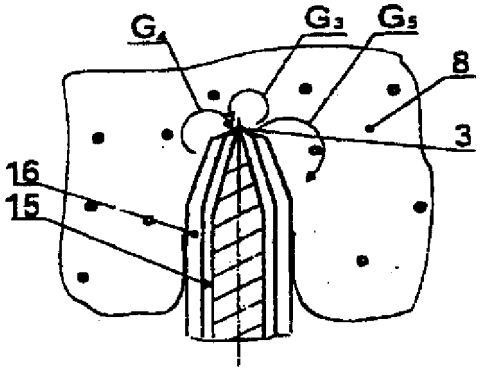

Fig. 7

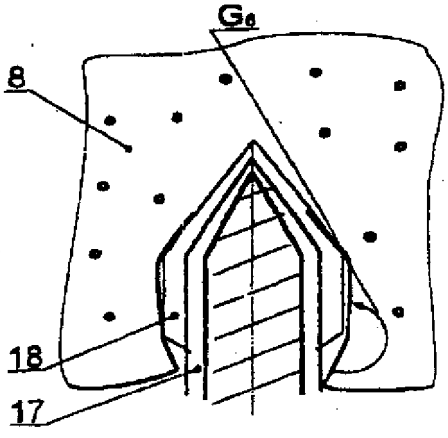

Fig. 8

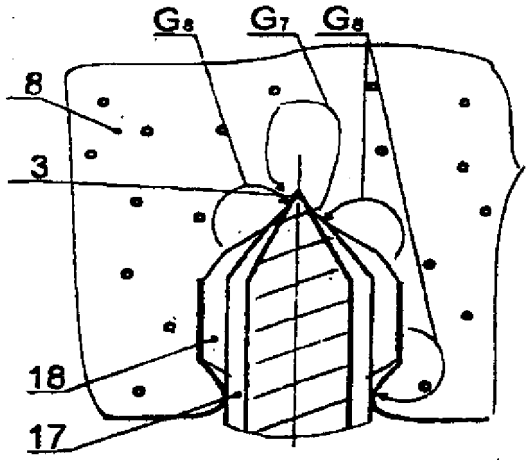

Fig. 9

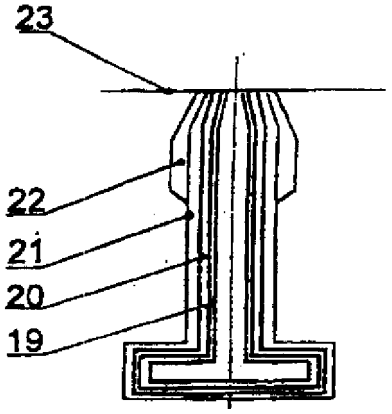

Fig. 10

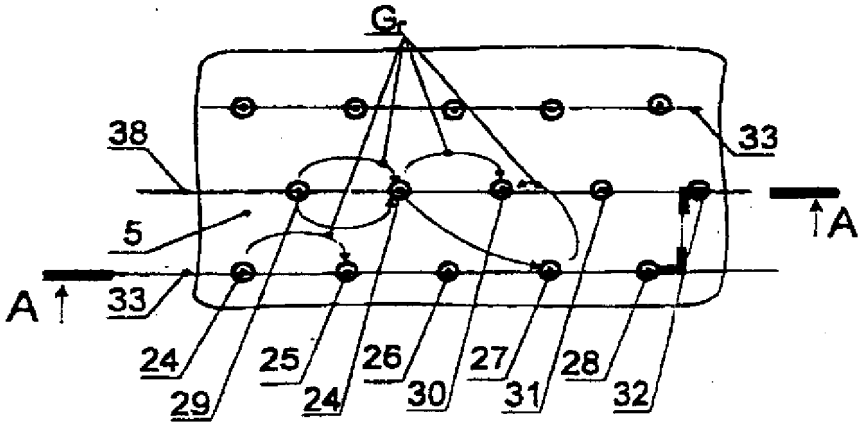

Fig. 11

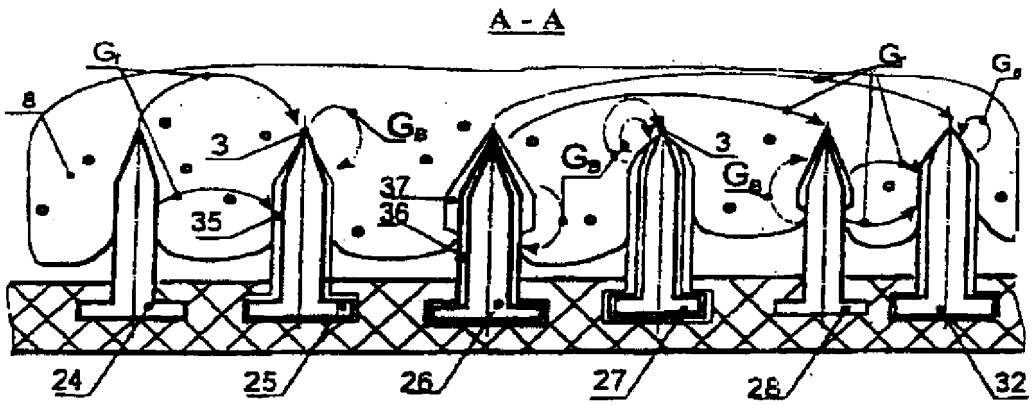

Fig. 12